

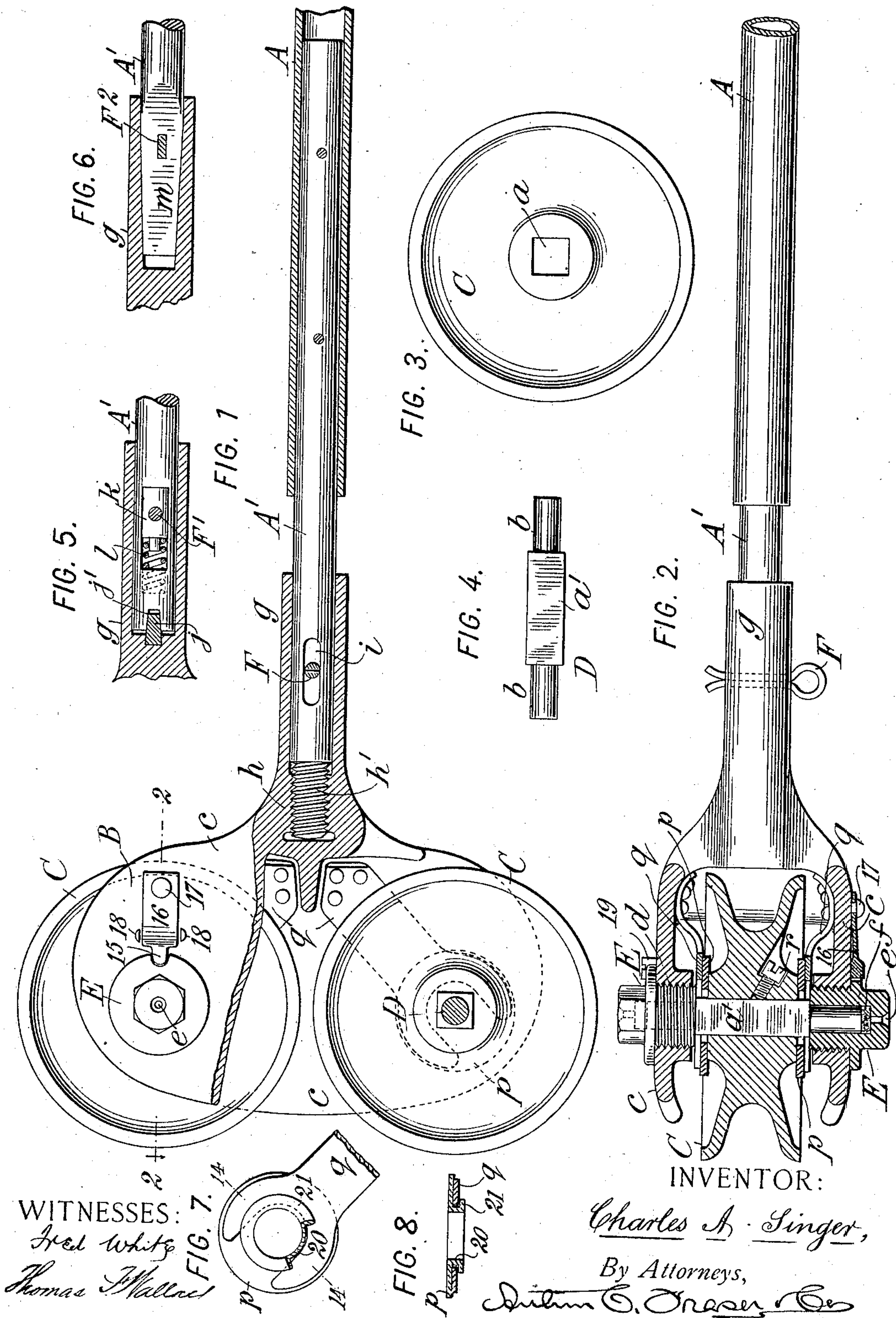
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C. A. SINGER.
UNDERRUNNING TROLLEY FOR ELECTRIC RAILWAYS.

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NO MODEL.



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UNITED STATES PATENT OFFICE.

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UNDERRUNNING TROLLEY FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 746,395, dated December 8, 1903.

Application filed February 7, 1902. Serial No. 93,023. (No model.)

To all whom it may concern:

Be it known that I, CHARLES A. SINGER, a citizen of the United States, residing at Larchmont, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Underrunning Trolleys for Electric Railways, of which the following is a specification.

This invention relates in part to the construction and mounting of the trolley-wheel and in part to the harp and its connection with the trolley arm or pole.

The liability of trolley-wheels to deterioration by wear and the difficulty of replacing such wheels in ordinary service are well understood.

One object of my invention is to enable a special or reserve trolley-wheel to be instantly substituted for one which is worn or out of order.

My invention also aims to improve the construction and lubrication of the trolley-wheel.

It also provides means for facilitating the temporary attachment of a sleet-wheel to cut from the trolley-wire any ice that may adhere.

Figure 1 of the accompanying drawings is a side elevation, partly in section, showing one embodiment of my invention. Fig. 2 is a sectional elevation, the sectional portion being cut away in the plane of the line 2 2 in Fig. 1. Figs. 3 and 4 are respectively a side view of the trolley-wheel and a plan view of the axle. Figs. 5 and 6 are sections of modifications of Fig. 1. Figs. 7 and 8 are detail side and sectional views, respectively, of parts hereinafter described.

Referring by letters to the drawings which form part of this specification, and on which like letters designate corresponding parts in all the figures, let A designate the trolley arm or pole of any usual construction, in the end of which is fastened, by riveting or otherwise, a rod or stem A'. Let B designate a trolley-harp, which instead of being adapted to carry only one trolley-wheel, as usual, is adapted for carrying two.

C C are the trolley-wheels, one of which is shown removed in Fig. 3. Each of these wheels is formed, preferably, with a square hole a for its hub, into which fits the square part a' of an axle D, preferably of steel. The end portions b b of the axle are made round

or cylindrical to serve as journals, which are received in bushings E E, suitably united to the side webs or cheek-plates c c of the harp, preferably by being screw-threaded and screwed into threaded sockets in said cheek-pieces, as clearly shown in Fig. 2. To prevent any tendency to unscrew, the respective bushings E E should be right and left threaded in such direction that if they were to turn with the trolley-wheel they would be screwed home. The bushings screw into threaded holes d in the cheek-pieces c, these holes being larger than the square part a' of the axle. The bushings have preferably each an oil-hole e through which to lubricate the journals, and each bushing preferably receives in its bearing-socket a felt f, adapted to retain the oil and feed it gradually to the bearing-surfaces.

To adapt the harp to carry two wheels, its cheek-pieces c are made much wider than has been usual, and the axes of the wheels are displaced, respectively, to opposite sides of the center line of the trolley-pole. The harp has the usual neck or sleeve g for engagement with the trolley-arm, which engagement may be made in various ways, whereby to admit of the harp being quickly and conveniently turned half-round on the arm in order to bring one wheel out of service and the other into service. It will be understood that the upper wheel shown is the active one, the other or lower wheel being held in reserve for use in case the active one becomes disabled. Various methods of attachment are applicable for carrying out this intended action, it being only necessary that the harp shall be capable of being quickly displaced relatively to the arm from a given active position to a substituted position, in which it has been shifted one hundred and eighty degrees around the prolonged axis of the arm. I have shown a convenient and suitable construction for this purpose; but numerous other constructions may be readily substituted. In the construction shown the parts are united by two fastenings, the one being reciprocal male and female screw-threads for preventing the harp from pulling off the arm and the other a locking device for preventing relative rotation of the sleeve in use. The socket in the sleeve or hub g of the harp is formed with internal

screw-threads h , while the end portion of the arm is formed with external screw-threads h' , the threads being, preferably, coarse and a free fit, so as to be easily turned. The non-rotating locking device shown consists of a transverse hole and slot and a cross-pin entering through these. The hole is shown in the sleeve as being filled by the transverse pin or cotter F , while the slot i is shown in the rod A' of the trolley-arm. To turn the harp, it is only necessary to pull out the pin, give the harp a half-turn in either direction, during which it is guided by the screw-threads, and then replace the pin. To prevent accidental working out of the pin, I have shown it as an ordinary cotter-pin with its ends spread. By way of illustration I have shown in Figs. 5 and 6 two other modes of making the desired connection between the harp and trolley-arm. In Fig. 5 the sleeve g of the harp has fixed in it a cross-pin j , which engages a notch j' in the end of the arm A' . The cross-pin F' passes through coinciding holes in the arm and sleeve, so that it might be removed in order to slide the sleeve endwise sufficiently to free the notch j' from the cross-pin j , whereupon the pin might be inserted to lock the parts. A more convenient construction, however, is that shown where in the pin F' passes through a separate block k , sliding in a recess in the arm and pressed into place by a stiff spring l . With this construction it is only necessary to strongly pull outward on the harp without removing the pin F' , so that the block k is pulled outward with the harp, compressing the spring until the cross-bar j is disengaged from the notch j' , whereupon the harp may be turned and upon completing a half-turn will snap back into the notch by the pressure of the spring.

In the simpler construction (shown in Fig. 6) the socket in the sleeve g is squared and engages a square and tapered portion m on the arm A' , a cross-pin f^2 being inserted to hold the parts in place.

I have shown the trolley-wheel provided with washers p p of conducting metal and the harp provided with springs q q , adapted to press against these washers to assist in conducting the current from the wheel to the harp in the usual manner. This feature forms no part of my invention.

In the use of the embodiment of my invention shown in Figs. 1 to 4 the upper wheel is the active one, and if it at any time gets out of order it is only necessary to stop the car for a moment, pull down the arm, and give the harp a half-turn in the manner already described, whereby the lower or reserve wheel is displaced to the active position. When next the car is out of service, the wheel which has become incapacitated should be removed. To do this, it is only necessary to unscrew one of the bushings E , whereupon the axle D may be pulled out, thereby releasing the trolley-wheel, which at once drops out of the harp and may be re-

placed by a new wheel, and, if needful, a new axle may also be inserted. As the bushings become worn they also may be replaced. Thus all the parts that are subject to wear are small light parts, which are easily removed and replaced. Even if both the trolley-wheels should be incapacitated during a trip they could both be easily replaced by new wheels and, if needful, by new axles and bushings, requiring a detention of the car much shorter than is required by the systems now in use. The square part a' of the axle should be a snug but free fit with the square socket a of the wheel, and no other fastening is necessary. If desired, however, a set-screw may be inserted through the wheel to bear upon the axle in the manner shown by the screw r in Fig. 2.

My invention is not limited in its application to multiple trolley-wheels, as it is in part applicable to a harp carrying a single wheel. In this case my invention presents the advantageous features of a trolley-wheel which is quickly and readily removed from its harp and replaced by another and of a harp which is readily removed from the trolley-arm and replaced by another. To remove the harp, it is only necessary to take out the pin F and (referring to Fig. 1) to give the harp a few turns to unscrew it from the screw-thread h' .

I have described the screw-bushings E E of Figs. 1 and 2 as being respectively right and left threads, so as to avoid any tendency to unscrew; but if in any case this precaution should be found or deemed insufficient I contemplate adding some device for locking them in place to positively prevent their unscrewing. In Fig. 1 I have shown the flange of the bushing E formed with a notch, into which enters a locking-tooth 15, which is mounted on a flat spring 16, so that the tooth can be sprung out to permit the bushing to be unscrewed. When sprung out, it can be swung around its fastening-rivet 17 out of the way. When in place, however, it is prevented from so swinging by lying between projections 18 18. A simpler but less convenient locking device consists of a single screw 19, as shown in the upper side of Fig. 2, which when in place lies in the notch in the flange of the bushing.

A further feature on my invention resides in the means for preventing accidental loss of the washers p p on removing either bushing E and taking out the axle D . To this effect the construction shown in Figs. 7 and 8 is preferable. The spring q , which is forked, as usual, embraces or engages in any suitable manner with an overhanging portion upon the washer p . One suitable construction is that shown where the washer has an inturned portion or neck 20, having an outwardly-projecting flange 21, the forked portion of the spring entering between the main part or body of the washer and the flange 21, as shown in Fig. 8. Hence when the axle is removed and the trolley-wheel drops out the

washer is caught by the spring and held in its approximate position so long as the harp is not inverted.

My invention is susceptible of considerable modification without departing from its essential features. I have herein indicated or suggested certain modifications which are within the scope or intent of my invention, but am not to be understood as limiting myself to those specifically suggested. For example, although I have specified an axle having a square portion a' fitting in a square hole a , yet it is to be understood that the portion a' may be of any other shape whereby a suitable fit with a correspondingly-shaped hole in the wheel may be made.

What I claim is—

1. The combination with the trolley-arm, of a harp mounted thereon having laterally-extended cheek-plates, a plurality of trolley-wheels mounted between said cheek-plates, and the harp mounted rotatively and adapted to be turned to bring either wheel to the active position, and locking means for fastening it in place in each such position.

2. The combination with the trolley-arm, of a harp mounted thereon adapted to turn about the axis of the arm, and having cheek-plates extended laterally of said axis, two trolley-wheels mounted between said cheek-plates on opposite sides of said axis, and locking means for fastening said harp on the arm in either of its opposite positions.

3. The combination, with the trolley-arm of a harp carrying the trolley-wheel and provided with a sleeve by which it is mounted

to move rotatively and longitudinally on the end of the trolley-arm, means for locking the harp against endwise movement of the trolley-arm and a pin-and-slot connection between the sleeve and trolley-arm by which the harp is adjustable endwise but is locked against a rotative movement of the trolley-arm.

4. The combination with the trolley-arm, of a harp mounted thereon, and a plurality of trolley-wheels, said harp being movable rotatively on said arm to bring one wheel or another to the active position, and having a sleeve embracing the end portion of the arm, and locking means for fastening the harp on the arm in either position, comprising screw-threads in said sleeve and on the arm, and a pin passed transversely through said sleeve and arm.

5. The combination of a trolley-wheel, a harp, a separable axle freely fitting the wheel and having journals projecting beyond it, bearing-bushings for said journals detachably united to the harp, the latter having threaded openings and the bushings having screw-threads to screw into said openings, and locking devices for the bushings comprising each a spring-mounted locking-tooth fixed to the harp and entering a notch in the bushing.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES A. SINGER.

Witnesses:

FRED WHITE,

THOMAS F. WALLACE.